MEETING MINUTES (FINAL)

CITY OF TUCSON HABITAT CONSERVATION PLANS (HCPs)
Technical Advisory Committee (TAC)
Wednesday, July 8, 2009, 9:00 – 12:00 p.m.
U.S. Fish & Wildlife Service, Tucson Field Office
201 North Bonita Avenue, Suite 141
Tucson, Arizona 85745

ATTENDEES

City of Tucson (COT) Habitat Conservation Plans (HCPs) Technical Advisory Committee (TAC) members present:
Dennis Abbate (Arizona Game and Fish Department)
Marit Alanen (U.S. Fish & Wildlife Service)
Rich Glinski (Arizona Game and Fish Department – *retired*)
Trevor Hare (Coalition for Sonoran Desert Protection)
Ries Lindley (City of Tucson – Tucson Water Department)
E. Linwood Smith (EPG, Inc.)

Other Attendees, including *ex-officio* TAC members, present:
Jamie Brown (City of Tucson – Office of Conservation and Sustainable Development)
Matt Clark (Defenders of Wildlife)
Mike Cross (no affiliation listed)
Locana de Souza (Arizona Game and Fish Department)
David Godlewski (Southern Arizona Home Builders Association)
David Jacobs (Arizona State Land Department / Arizona Attorney General's Office)
Leslie Liberti (City of Tucson – Office of Conservation and Sustainable Development)

1. Welcome, introductions, and ground rules

Per Technical Advisory Committee (TAC) member(s) request, non-TAC members were asked to provide any comments to the discussion during the Call to the Audience portion of the meeting.

2. Review TAC meeting minutes

No draft minutes were available for review

3. Updates

Leslie reported that the City of Tucson's (COT's) Office of Conservation and Sustainable Development (OCSD) recently released its annual report, which she distributed to TAC members and other attendees. The report highlights what the COT is doing in terms of sustainable development.

4. Discussion

Greater Southlands HCP: Draft Responses to Resource Planning Advisory Committee (RPAC) questions about HCP Covered Species and riparian habitat

As background, Jamie mentioned Ann Audrey's (COT – OCSD) recent presentation to the TAC on the Resource Planning Advisory Committee's work developing an alternate or revised riparian habitat protection ordinance for the COT. At the end of her presentation, she asked TAC members several questions related to the Greater Southlands HCP Planning Area and riparian habitat. Initially, TAC members suggested that they form a subcommittee to draft responses to these questions. However, members later asked that Jamie draft responses and get TAC feedback. Jamie said that the purpose of these responses is to help inform how the alternate or revised riparian habitat protection ordinance may consider Habitat Conservation Plan (HCP) Covered Species needs in the Greater Southlands.

Jamie mentioned that, prior to the current TAC meeting, he distributed the draft responses to TAC members for review and revisions, edits, and/or comments. The discussion below began by reviewing comments received from TAC members. On page two, Jamie asked for input regarding whether or not agave species occur within the Greater Southlands HCP Planning Area. Various TAC members said that agaves most likely occur within the HCP Planning Area, but just along the edges of the boundary at higher elevations.

Under pale Townsend's big-eared bat (PTBB), Jamie mentioned that the draft response document currently states that this insectivorous bat feeds primarily on small moths. Within the Greater Southlands HCP Planning Area, these moths tend to be most plentiful in riparian areas and adjacent uplands. Rich suggested changing the language to say the "interface" between riparian and upland vegetation. Trevor mentioned that adjacent probably means "immediately adjacent." In terms of the distance from the edge of the riparian vegetation, Jamie said that the TAC has discussed 50 feet. Trevor said that we cannot assume that PTBB forage only on the outside of the riparian area. Jamie referred to the Species Conservation Assessment and Conservation Strategy for the Townsend's Big-Eared Bat, 1999, which describes how radio tracking studies in northern California found that the bats forage along forested areas and heavily vegetated stream corridors. The 1999 report states that they are lepidopteran specialists with a diet consisting of more than 90% moths and that they prefer edge habitats and open areas near edge habitats. Leslie wondered if the best way to word it is "open spaces within riparian corridors and the edge between the riparian and the upland." In other words, they prefer more open areas as opposed to the dense canopy areas along riparian habitat. Rich asked if the edge could be above the riparian vegetation. Lin said he said he couldn't say for a fact, but did not know why they would not.

With regard to the Western yellow billed cuckoo (WYBC), Jamie said that the response document states that they are thought to use the relatively higher canopy cover, vertical structural diversity and humidity of riparian areas as dispersal corridors. Rich was unclear what this meant and wondered if there was any literature that substantiates the role of humidity in riparian corridors being important for this species. He said he knows that they breed when the summer rains arrive. Lin said that in areas where there are WYBC nests, there is moist soil. He added that

high humidity is one characteristic of the areas that they typically nest in. However, Lin said that humidity may not be as important to WYBC for dispersal. He said that they may disperse through a mesquite bosque, but not nest in one. He said that humidity is more important for nesting habitat.

In terms of cactus ferruginous pygmy-owl (CFPO), the document mentioned that the vertical structural diversity of riparian vegetation provides dispersal as well as over-wintering habitat. Rich said that he thought that vertical structural diversity was not as important as horizontal structural diversity in terms of patchiness. He said that this is an important factor when CFPO move from one mesquite shrub to another or a palo verde to another. Dennis said that he thinks that is a fair statement if one is talking specifically about over-wintering or dispersing CFPO. Trevor wondered if it should just say "structural diversity" and Rich said "patchiness" more than anything. Trevor wondered if it should say "structural diversity and patchiness". Dennis said that when stated like that, it almost sounds like they prefer patchy areas and he's not suggesting that CFPO select patchy areas over contiguous areas.

Rich said that it seems to him that CFPO do not care if the area has a higher degree of vertical structural diversity as much as if there are patches where they can move in the two dimensions. Dennis said that CFPO are looking for cover and that the vertical structural diversity is more characteristic of breeding habitat. Dennis said, in reference to a statement on the response document, that AGFD doesn't have any evidence that CFPO use cavities during dispersal or over-wintering.

Trevor suggested adding "geomorphological" processes next to "fluvial" on page two of the document. He added that, in terms of WYBC, he thinks that breeding has been detected along Cienega Creek in Las Cienegas National Conservation Area, not in the Pima County Cienega Creek preserve near the Greater Southlands HCP Planning Area. Lin agreed and added that AGFD did a lot of WYBC research a decade or so ago. *[Action item: OCSD staff will work with AGFD HDMS staff to determine whether or not there is documentation of WYBC breeding within or near to the Greater Southlands HCP Planning Area.]*

Rich said that on page three, the document states that CFPO appear to avoid predators by taking short movements between trees. He asked Dennis if it should also say "scrub or shrub" since they may go into shrubs 5 feet tall. Dennis agreed saying that CFPO use larger shrubs as well.

In terms of CFPO dispersal habitat, Jamie said that TAC discussions of long-term ecological effectiveness monitoring for the Avra Valley HCP informed the use of language about vertical structural diversity. He said that foliage height diversity or vegetation structure was one of the variables that had been suggested by the TAC for use in the xero-riparian areas of the Brawley and Blanco Washes. Leslie wondered if it would be fair to say "contiguous xero-, meso-, or hydro-riparian vegetation with a preference for higher vertical structural diversity."

Rich said that, in breeding situations, the vertical structural diversity is more important and Dennis agreed. Dennis said that the area we're talking about has more limited vertical structural diversity, but, once again, CFPO are looking for cover. Whatever structure is out there that will provide the most cover is their preference. Rich asked if CFPO use mesquite bosques for

breeding. Dennis said that historically, experts suggested that CFPO used mesquite bosques as breeding areas. However, in the last several years, they haven't been found in these areas. Trevor said that, historically, the mesquite bosques were on the edges of cottonwood-willow forests, which provided nesting cavities.

Rich said that mesquite bosques have surprisingly little vertical structural diversity. Trevor said that these areas have higher density though. Leslie wondered if the TAC was talking about canopy cover, density, patch size or a combination of these. Jamie said that, in responding to these questions, he was considering the habitat model that has been used in the Preliminary Draft Greater Southlands HCP. He said that the modeled habitat is based on Pima County's Harris riparian study. Jamie wondered if, hypothetically, the landscape became a monoculture of the non-native *Tamarix aphylla,* would it still be considered CFPO dispersal habitat. Dennis said, in the absence of better alternatives, yes it would. He said that the CFPO they tracked perched in areas they would never suspect, although this was very temporary. The area they happened to be moving through, they used whatever perch structure or cover was available.

Jamie asked for specific TAC recommendations for riparian habitat protection for the CFPO. Dennis said that, in these discussions, we're separating out breeding, dispersal, and over-wintering habitat. However, when thinking about the whole package, one should consider vertical structural diversity. Rich suggested adding "horizontal" to structural diversity. Leslie said she wanted to get back to what Dennis said about making the distinctions between habitat types. Within riparian areas of the Greater Southlands HCP Planning Area, she said that there has not been any identified CFPO breeding habitat. She added that, in terms of the habitat model, it's mostly framed as over-wintering and dispersal habitat. Leslie said that the more specific the TAC makes its recommendations, the more useful the information is to the RPAC. Contiguity is obviously a factor, but she asked what CFPO have a preference for. She wondered if we need to focus on patch size or density. These aren't necessarily the same two areas.

Rich said that the distinctions between breeding, dispersal, and over-wintering are not exact and that the habitat type and quality varies along a continuum. So, he said to be safe for considering what is appropriate CFPO habitat -- habitat that will attract the birds -- the TAC should look at the habitat for breeding characteristics. In that case, he said that the TAC should look at both vertical and horizontal patchiness. He added that it is not all contiguous; there are "chunks" here and "chunks" there but vegetation species type is not as important. Jamie wondered if Rich was saying that although these xero-riparian areas are currently modeled as CFPO dispersal habitat, in terms of recommendations for ensuring good CFPO habitat quality, he recommended looking at breeding habitat characteristics. Rich agreed.

Leslie said that the task of the RPAC is to balance the reality of development with the essential functions of riparian habitat. Therefore, the more specific input the TAC provides about the essential functions, the better these can be incorporated. Leslie asked the TAC to give the RPAC some sense of the priority. Dennis said that larger areas are better, with more mature vegetation and higher vegetation density. However, he said that when one starts asking for specifics, then one gets into the dangerous area of determining the number of acres and how tall the trees need to be. Yet, nobody has that kind of information. Trevor said that in contrast, we want to protect the swales that do not have habitat for any of the HCP Covered Species. Dennis said that we

know that, on average, CFPO move 30-40 meters at a time. When talking about density or distance between patches, the density or structure should support this average flight distance. Leslie drew on the white board. She described wash and floodplain areas that have varied vegetation density (e.g., highly patchy) and vegetation categories (e.g., mostly herbaceous). Leslie said that it is unrealistic to recommend protecting the 100-year floodplain for every wash in the COT. She added that helping the RPAC to understand where impacts can be tolerated is useful. Trevor said that we need to protect a representative amount of each of the types.

Leslie said that the watercourses provide for hydrological and dispersal connectivity for the Covered Species. Rich wondered if the general habitat needs of CFPO are captured by WYBC habitat in the Greater Southlands. He also said that, if just for CFPO, he would phrase it as a "diversity of vegetation species in an arrangement of horizontal structural diversity". He would add "vegetation species diversity" to provide various prey options for CFPO as well as both horizontal and vertical structural diversity. Leslie said that the COT does not currently have a way to measure horizontal vegetative diversity when a project comes in for review. However, she said that the COT will have some sense of species diversity since everyone is required to do a plant inventory.

Trevor asked if the required plant inventory includes a measure of size classes and, if not, then it wouldn't be that much more work to include this. Leslie didn't think that the ordinance requires size classes. Lin said that, based on what he recalls reviewing as part of the Stormwater Advisory Committee, he doesn't think size classes were included. Trevor said that we need additional information, such as size classes, as part the biological inventory.

Leslie said that another challenge with riparian protection ordinances is that there is a limit to what the COT can and will require. This is because there is a cost associated with these reports. She said that one of the biggest criticisms of current regulations is that they are relatively costly to comply with in terms of creating reports. Trevor disagreed and said that biological inventories are cheap insurance.

Leslie said that the TAC can make recommendations and being specific helps translate into what has to be measured to determine the appropriateness of protecting versus allowing some impacts. Rich said that we measure to the inch but manage to the mile and so when it comes to the vertical or horizontal diversity, he doesn't think we need someone to spend a week telling us exactly what species are out there. Rich said there could be several horizontal diversity categories. One such category could be in cases where surface water flows down a narrow, defined channel and all the vegetation is confined to that narrow corridor. In this case, there would be low horizontal diversity. He said that an aerial photo could inform the amount of horizontal vegetation diversity. Rich said that horizontal diversity could be divided into four categories:

- None (no perch substrate)
- Linear/confined/constrained and less than 20 ft. wide
- Kind-of patchy (20 percent of site is covered with vegetation)
- Patchy (40% cover arranged in diverse patchiness)

Leslie wondered if "patchy" means trees in the floodplain not just along the narrow strip. Rich said that greater percent canopy cover would yield a greater number of vegetation "hits" as one passes through along a transect. Dennis said that this patchiness is what will allow CFPO to persist since CFPO don't just follow a linear corridor. He said that, according to AGFD tracking studies, CFPO move from wash to wash and need "stepping stones" of vegetation patches (perching structures and cover). This is why he falls back to the 30-40-meter average movement distance. Dennis said that CFPO were found to use landscape plants, such as eucalyptus, because they provided cover and were available.

Jamie referred to the recommended 50-foot upland buffer for PTBB and the contiguous riparian vegetation needed for LLNB. He wondered if the combination of these two attributes would capture the habitat needs of dispersing CFPO. That is, he wondered if this 50-foot buffer of upland vegetation could help CFPO cross over to other washes. Leslie said that the group is focusing on what's in the floodplain. She wondered if patchiness is a function of total percent canopy cover or the distance between patches outside the linear corridor. Rich said that it is the arrangement of patches. Leslie wondered what the measure is based on. Rich said that 40% cover arranged in diverse horizontal patchiness would be a good minimum. Trevor said that he would have to see this on a map. Leslie said that 50% is pretty easy to "eyeball" on an aerial photo. Trevor disagreed, saying not necessarily if trying to quantify discrete patches in a large area. Rich said that squinting at the aerial photo helps distinguish areas of dense canopy cover versus those without. He said that "patchy" refers to the arrangement of vegetation along the horizontal plane. Leslie wondered if it is a measure of evenness in terms of the distribution of patches. Rich said that he thinks it's more "randomness" than "evenness."

In thinking about vegetation characteristics, Trevor asked Dennis about the prey items that CFPO take. Dennis said that they are opportunists and so they may take small prey items or relatively large items such a desert spiny lizards. In Texas, there is a fair amount of evidence that they rely on insects, but there are more insects available in that portion of the CFPO range. In Arizona, Dennis said that AGFD has seen CFPO occasionally take insects such as cicadas, but the bulk of their diet is everything except cicadas. If cicadas come out, they'll take advantage of it. He added that, in the warmer months, CFPO take a lot of lizards and birds. In the colder months they take a lot of rodents.

In terms of the discussion of evenness versus randomness, Leslie said that she got one nod for patchiness and evenness. Rich said that vegetation species diversity provides prey diversity. So, diversity of vegetation species distribution is also important. Leslie wondered about the need to specifically recommend native versus non-native vegetation. Trevor said that *Tamarix aphylla* (Athel tamarisk) provides cover and perch structure, but a dense patch of the shrubby *Tamarix* species probably provides no habitat value for CFPO. Rich said that shrubby *Tamarix* species provide habitat for cicadas.

Dennis said that as far as non-native vegetation is concerned, he said that in AGFD studies of northwest Tucson and Marana, they saw CFPO use a fair amount of landscape plants such as eucalyptus since it was available and provided cover and structure. However, he said that he doesn't think CFPO were selecting for it. In a natural landscape, if CFPO had a choice between a

dense stand of mesquites and Athel tamarisk, he said he thinks they would choose the native mesquite.

Ries said that there was something that was bothering him but he wasn't sure how to express it. He said he was imagining being in some place in the Greater Southlands with a certain amount of annual rainfall conveyed by the network of washes. He referred to the example discussed previously of the incised watercourse channel that contained all of the flow. He said that, in the discussion, the TAC is putting a low habitat value on that. However, he said that as flows spread out, we start to see more of the important diversity characteristics we have been talking about, such as patchiness of cover. Yet, elsewhere in the watershed where there is sheetflow, only the mouth would have enough water to support vegetation based on our region's average rainfall. These areas may support tobosa swales if completely spread out and, according to this TAC discussion, this would have no habitat value. With this system you might be protecting a small number of patches of potential habitat and it places no value on doing something about incised washes. He said this was describing a bell-shaped range from low habitat value, to high, to none. That middle point is all the TAC was putting value on. Leslie said that perhaps this view is looking at this species in isolation and it doesn't recognize that these are just priorities. What the RPAC wanted was, for specific species, what they should be looking for in terms of riparian habitat protection. For different species, it might be a different arrangement.

Trevor said that, at the landscape level, the TAC should focus on getting the representativeness for all the different types of systems. It's not just the species priorities, it's also putting the species priorities together and then saying, what are we not protecting at the landscape level. For example, we may be missing the incised washes and so we may need to identify these areas as needing special protections. Leslie said that this has been part of the discussion with the RPAC in terms of being a little more flexible in how the COT deals with incised washes and not being so rigid in terms of mandating no or very little impact. Instead of worrying about protecting a bunch of non-native palo verde, a balance would involve more restorative types of actions.

Rich said that it sounded like Ries's comments had more to do with hydrology. Ries said that if the water is only so deep, then the shrub/scrub and trees are likely to be in a linear fashion along the watercourse. He said what Leslie is talking about is healthy wash systems. Trevor said that we are trying to get HCP coverage for these species and so we have to balance it all. Leslie said that the RPAC is trying to deal with how to maintain a healthy wash system through this ordinance. This is why there is a large contingent of environmental interests on the committee, including representatives from Tucson Audubon Society, Arizona Native Plant Society, the Coalition for Sonoran Desert Protection, and others. The other half is composed of representatives from development interests. What they want from the TAC are any specifics, refinements, or details on Covered Species so that when they are considering ways to preserve wash function, they are not missing something because they don't have the detailed knowledge of these species.

Rich said that the CFPO really helps here because if we prioritize evenness or patchiness, we're placing higher value on that than the linear wash corridors. He said he didn't know how that would trigger enhancement of linear habitat to get away from the guttered, entrenched system and have the water distribute more evenly throughout the floodplain to get a more horizontal

diversity of vegetation. Leslie said that the washes that typically fall into the linear category are within the urban core and not in the Greater Southlands HCP Planning Area. Trevor said that on the far west side of the HCP Planning Area there are more linear, entrenched washes near the airport. Leslie said that they are a little more defined in the channel, but they are generally not the trapezoidal, constructed channels of the urban core.

Trevor asked if Frank Sousa had categorized all of the washes in the Greater Southlands. Leslie said that prior to his retirement, he started, yet there is a lot of work that still needs to be done. She said that she is looking at how the COT can collect better information about washes. Trevor asked if washes were categorized as part of the Lee Moore Study. Leslie said no, but the Lee Moore Study planning team did map most of the floodplains. She said that they also looked at the priorities that came out of the TAC in terms of the washes, they considered the Harris riparian study from the Sonoran Desert Conservation Plan. However, these weren't the focal drivers for determining which washes should be included in each category. Trevor said that he thinks what was discussed today was a good start and that we should test it. He added that this should then be done for all the other species. Leslie asked how this should be tested. Trevor suggested bringing in examples of areas throughout the planning area.

Trevor said that there is a 500-meter buffer and a 50-foot buffer described in the response document and the TAC should test those, too. Leslie said that it would be good to determine on which washes the 50-foot buffer would be most beneficial. Trevor said that it would also be good to know what is being buffered against in terms of land use. Leslie said that one of the things that the RPAC has discussed in addition to making a distinction between the habitat quality is the type of land use that is being proposed by the specific project.

Ries asked about how the buffers were determined and if it was based on flow volume or channel width. Leslie said that the 50-foot buffer was a figure suggested by Lin based on his experience and knowledge of PTBB. Rich concurred. Leslie added that other TAC members approved this. Ries wondered if basing this buffer on volume may be more appropriate. Trevor said that that was not a bad idea. He added that some important literature published recently by Raymond Semlitsch recommended a 1-kilometer buffer for amphibians. He noted that Mr. Semlitsch's work is based in the mid-West. He said that he passed this information along to Sherry Barrett of the USFWS. He also suggested that a floating buffer based on surrounding land uses that doesn't just taking into account the PTBB, but also other critters and the landscape in general, may be a better approach.

Leslie said that one challenge is that the COT's regulatory area is the 100-year floodplain and so if one is looking at preserving buffers through the wash ordinances, it is kind of difficult. Trevor asked about Erosion Hazard Setbacks and Leslie said those were from the flow corridors not the floodplain. Trevor asked what other regulatory mechanisms were possible for lands outside the floodplain. Leslie said the Native Plant Preservation Ordinance and, for future annexations, the Mayor and Council recommendation to create and adopt a policy that requires compliance with Pima County's Conservation Lands System. She said that, at the TAC meetings involving discussion of Pima pineapple cactus, the TAC was starting to integrate these three tools. She said she liked the idea of the TAC taking some sample washes and "drilling down", for each species, to determine the priorities.

Trevor referred to where Jamie wrote “minimize and mitigate” and said that it should always say “avoid” before “minimize and mitigate” because avoidance is part of the legal language.

David referred to the top of page five of the response document and asked if these 50-foot buffers must be natural vegetation. He said having some idea of what the 50-foot buffer would be used for would be helpful. He said that the document suggests that all the Covered Species need the 50 feet, not just the PTBB. This may or may not be the view of the TAC and others. Jamie said that since the RPAC question referred whether or not there was a need to consider riparian buffers, he took the view that if this is required for the PTBB then all species needs are within that. So, that 50-foot PTBB riparian/upland interface is the constraint. David said that this may come back to the COT since it depends on what the bat needs and not necessarily what the other species need. Trevor said that he thinks there could be flexibility on the buffers. David said that if it is a 300-foot wash corridor, perhaps the buffer characteristics are contained within that and so this should be considered. As far as the PTBB is concerned, David said he wasn’t sure what the 50 feet is for. He noted that 50 feet is twice the length of the meeting room, which the TAC is currently saying would be required on both sides of the edge of riparian vegetation. All of this land is a big economic issue.

Avra Valley HCP: Monitoring Program

Jamie said that the current focus for the Avra Valley HCP is to have a final draft completed in the next several months. He said that there is text in the Preliminary Draft HCP that briefly describes some monitoring activities. However, he said that the COT and TAC now need to consider what monitoring activities should actually occur, what will be the most efficient approach for determining whether or not the COT is causing take to the species, and how we can measure our ecological effectiveness over the 50-year duration of the HCP. Jamie said that he has been working to provide exhibits, worksheets, and maps for the TAC to consider the details of a monitoring program. Jamie said that he would like to go out in the field and experiment with different vegetation monitoring protocols to help inform whether or not they should be used and how much variation in the data there is to inform sampling design.

Jamie said that the USFWS 5-points policy provides guidance on what is required of monitoring reports, and therefore monitoring programs. It states:

> *The following list generally represents the information generally needed in a monitoring report:*
>
> 1. *Biological goals and objectives of the HCP (which may need to be reported only once);*
> 2. *Objectives for the monitoring program (which may need to be reported only once);*
> 3. *Effects on the covered species or habitat;*
> 4. *Location of sampling sites;*
> 5. *Methods for data collection and variables measured;*
> 6. *Frequency, timing, and duration of sampling for the variables;*
> 7. *Description of the data analysis and who conducted the analyses; and*

8. *Evaluation of progress toward achieving measurable biological goals and objectives and other terms and conditions as required by the incidental take permit or IA*

Jamie said that he is using this, and other components of the HCP handbook, as guidance to develop pieces of the monitoring program. Jamie asked that the TAC first review a spreadsheet that summarizes the planning area habitat for each species, biological goals, biological objectives, and possible monitoring indicator variables. In terms of the biological objectives, Jamie didn't know how the COT and TAC would know if they met the second biological objective for the lesser long-nosed bat, which is to "Minimize potential for mortality of LLNB" This is because there are no roosts in the planning area and their use of the habitat is limited to movement through the valley. Dennis wondered if reduction of light pollution in the wash areas could be included. He said that this would be a practical plan of action and would also give merit to the AGFD LLNB movement study, which found that LLNB selected for areas of lower light pollution, which were the washes.

Trevor wondered if LLNB cross roadways and if they selected crossing areas with less light or if they flew higher over roads with lights. Dennis said that it is important to keep in mind that when tracking the bats, field personnel can't see them. They are moving quite quickly. Dennis said that someone had suggested that LLNB may fly 100 feet above the landscape. In answer to Trevor's question, we don't know. There were times when we felt that they flew right through a four-lane intersection with all of the lights. It wasn't common, but it did happen.

Jamie said he wasn't sure how it related to mortality. Dennis said that changing movement patterns makes these bats more vulnerable to mortality. Marit suggested removing the word "suitable" before the word "habitat" because it is either habitat or it is not. Dennis said that there are different gradients of habitat and these should not get discarded in the discussion. Jamie said that the way in which the model for the WYBC was created divided the landscape into habitat or non-habitat. Rich said that as information is collected over time, the models can be refined. Jamie asked Marit about how gradients of habitat would be used in her evaluation of the HCP. Marit said that they normally look at habitat versus non-habitat, but gradients of habitat quality could also be assessed.

In terms of the Western burrowing owl (BUOW), it was proposed that the objective to increase the number of breeding pairs be removed because of all of the outside factors beyond the COT's control. Rich said that the BUOW habitat evaluation did not take into account over-wintering and migratory habitat which is different than nesting. There is a lot of potential for helping BUOW move through the planning areas. These irrigation canals might be one of those resources. Trevor said that Marana's HCP proposes to provide areas for burrowing owl movement and over-wintering. Rich said that we should be open to adaptive management for the burrowing owl in case the BOMAs do not turn out to be as effective as originally conceived.

Ries said that if buffelgrass can be removed and its growth and spread limited within the HCP planning area, that would be a big help.

Dennis said that these habitat models assume that conditions on the ground are static, which isn't realistic. For example, a badger could move in and create burrows that were not in existence when the model was made. He wondered if language should be inserted into the HCP to account for these changes. Jamie wondered what that language would be and if it meant that the habitat model needed to be continually updated during the term of the HCP. Dennis said that as activities occur, if burrowing owls are detected, then there should be protocols for handling this (e.g., relocate to BOMA). Jamie said that pre-construction clearance surveys have been recommended as a conservation measure for BUOW. Rich suggested that, apart from the two covered bat species, that pre-construction clearance surveys occur for all species. Jamie said that this had been discussed at recent TAC meetings and it was determined that these pre-construction clearance surveys were only applicable for the BUOW. This is because Phil Rosen has indicated that the two snake species are too secretive and rare to make these worthwhile. Also, there is no breeding habitat for the other two bird species and so direct take from construction activities is very unlikely. There was debate about the need to do pre-construction clearance surveys for the CFPO and Jamie suggested that, as a changed, circumstance, if it is determined that the planning area supports CFPO breeding habitat, then pre-construction clearance surveys could be required. TAC members seemed to think this made sense.

There was continued discussion of what to do if BUOW are detected in terms of eviction or relocation. Rich said that this implies that we know what's best for these owls. He said that Mike Ingraldi has data that shows that owls use different areas for different purposes. Dennis said that he knows which data Rich is referring and it has to do with a few individuals that were tracked and found to be dispersing in a more heavily vegetated area (creosote) than previously thought. Rich said that we just have these qualitative glimpses of BUOW habitat preferences and there could be more to it than that. There could be a use through the washes that is important for burrowing owls.

Rich continued by saying that the TAC needs to think about, if BUOW are detected, not just sticking them in a BOMA. Trevor said that there are 20,000 acres out there and projected impacts are only about 7,500 acres. Rich said that, nonetheless, we don't really know the use by the BUOW. We need something to expand our vision for what's going on with BUOW, even if it's incidental monitoring. Rich suggested adding into the HCP language such as "Engage opportunities to learn more about BUOW use of the area" *[Action Item: Per Rich's request, add "Engage opportunities to learn more about BUOW use of the area" under conservation measures for BUOW.]*

In terms of Tucson shovel-nosed snake (TSS) and ground snake (GS), the TAC discussed biological objectives related to minimizing loss of individuals. Trevor suggested that, since roads are a source of direct mortality, environmentally sensitive roadway design guidelines should be considered. Jamie said that since the planning area is composed of COT-owned former farm parcels in unincorporated Avra Valley, he wondered how much direct control the COT would have over roadway construction design, other than for project maintenance roadways on the individual parcels. He added that public road construction is not currently a covered activity for the Avra Valley HCP. Ries agreed and said that access to these maintenance roads is limited. Ries added that there are access roads to several homes that cross COT-lands. However, these

were never intended to be official County or COT roadways; they are remnants of past land disputes.

Rich said that these maintenance roadways wouldn't be a concern. The concern would be a major roadway that winds through the properties and divides snake habitat or a major roadway adjacent to these COT lands. In this case, perhaps a barrier to keep the snakes off the roads should be considered. Jamie wondered if the COT, through its HCP, could make recommendations to those entities planning major roadways to conduct roadkill surveys to determine where snakes may be crossing. Following environmentally sensitive roadway design guidelines, such as Pima County's could then be recommended in areas of concern. Trevor said that he doesn't think scientists and researchers have gotten to the point where they know how to keep snakes off of roads. He wondered if Matt Goode was investigating structures along highway 79 that are used to keep snakes off the road. Dennis said that AGFD is currently working on several projects studying the use or non-use of culverts along various roadways throughout the state. These involve cameras that look at various sizes and configurations of culverts to see what appears to work best for different species. He added that a complimentary AGFD project involves testing a number of fencing options to see how effective they are as a barrier. Based on this research, they make recommendations to planners.

Rich said that results will not be available for a while and so it is important to keep the statements about minimizing loss of individuals and the focus will be on roadway mortality. Trevor suggested that roadways bisecting or adjacent to modeled habitat should follow environmentally sensitive roadway design guidelines. As the conversation continued, Dennis mentioned that AGFD research suggests that the funneling materials and crossing structures are species specific and that there is not one structure that seems to work for all species.

Jamie reviewed the changes he made to the monitoring and management draft flow chart based on previous TAC discussion. For example, Jamie made changes based on Rich's recommendation that monitoring of the riparian woodland take priority and that it should occur throughout the term of the HCP, not just when projects occur. The new version reflects his concerns, with these areas receiving periodic monitoring for presence of invasive, plant species and photo monitoring. Rich said that the status monitoring should involve statistical considerations for measuring long-term trends. He considers the monitoring of invasive plant species as protection monitoring to assess risk to the resource trying to save. He thinks every 3-years is good. In terms of photo monitoring, Trevor referred to an example from the 2006 Avra Valley baseline study and suggested that the datum be listed as well as a scale reference.

In conclusion, Jamie said that he would like to experiment with collecting vegetation structure data in the field. In talking with Brian Powell of Pima County, he said that the particular method is not as important as making sure that method is well described to make it repeatable as possible. It's important to limit observer bias to the extent possible.

5. **Upcoming meetings**

The TAC reviewed the schedule of upcoming meetings.

6. Call to the Audience

Mike Cross read recent TAC meeting minutes and noticed that COT staff were considering moving away from highly detailed minutes to summaries. He wondered why and if that was consistent with COT policy. Jamie said that the TAC minutes are more detailed than those provided by other COT committees. He said that these have been helpful, but take considerable staff time to write. He added that with COT staff budget constraints, there are not the staffing resources to assist. Given the timeline for completion of the final draft Avra Valley HCP, more staff time needs to be dedicated to completing any unfinished components. Where appropriate in meetings, such as informal discussions, summaries may be written as opposed to more detailed notes.

7. Adjournment

The meeting was adjourned at 4:15 p.m.

Summary of Action Items:

- OCSD staff will work with AGFD HDMS staff to determine whether or not there is documentation of WYBC breeding within or near to the Greater Southlands HCP Planning Area

- Per Rich's request, add "Engage opportunities to learn more about BUOW use of the area" under conservation measures for BUOW.